JEE Main 2025 Apr 2 Shift 2 Question Paper with Solutions

Time Allowed :3 Hour	**Maximum Marks :**300	**Total Questions :**75

General Instructions

Read the following instructions very carefully and strictly follow them:

1. The test is of 3 hours duration.
2. The question paper consists of 75 questions. The maximum marks are 300.
3. There are three parts in the question paper consisting of Physics, Chemistry and Mathematics having 25 questions in each part of equal weightage.
4. Each part (subject) has two sections.
   (i) Section-A: This section contains 20 multiple choice questions which have only one correct answer. Each question carries 4 marks for correct answer and –1 mark for wrong answer.
   (ii) Section-B: This section contains 5 questions. The answer to each of the questions is a numerical value. Each question carries 4 marks for correct answer and –1 mark for wrong answer. For Section-B, the answer should be rounded off to the nearest integer.

1. Correct order of electronegativity in below elements:

(a) $1s^2 2s^2 2p^3$ (N)

(b) $1s^2 2s^2 2p^4$ (O)

(c) $1s^2 2s^2 2p^5$ (F)

(d) $1s^2 2s^2 2p^6$ (Ne)

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2. What is the dimensional formula of $\frac{1}{\mu_0 \epsilon_0}$ (where μ_0 is permeability and ϵ_0 is permittivity of free space)?

(1) LT^{-1}

(2) L^2T^{-1}

(3) MLT^{-1}

(4) ML^2T^{-2}

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3. Total number of terms in an A.P. are even. Sum of odd terms is 24 and sum of even terms is 30. Last term exceeds the first term by $\frac{21}{2}$. Find the total number of terms.

(1) 10

(2) 12

(3) 14

(4) 16

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4. In 3, 3-dimethylhex-1-en-4-yne, the number of sp, sp² and sp³ carbon atoms, respectively are:

(1) $2, 2, 4$

(2) $2, 2, 2$

(3) $4, 2, 2$

(4) $2, 4, 2$

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5. An equilateral prism is made of a material of refractive index $\sqrt{2}$. Find the angle of incidence for minimum deviation of the light ray.

(1) 60°

(2) 30°

(3) 37°

(4) 45°

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6. If the domain of the function $f(x) = \frac{1}{\sqrt{3x+10-x^2}} + \frac{1}{\sqrt{x+|x|}}$ is (a, b), then $(1 + a)^2 + b^2$ is equal to:

(1) 25

(2) 16

(3) 24

(4) 26

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7. Nature of compounds TeO and TeH is _____ and _____ respectively.

(1) Oxidising and Reducing respectively

(2) Highly acidic and highly basic respectively

(3) Reducing and Basic respectively

(4) Basic and oxidising

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8. The moment of inertia of a ring of mass M and radius R about an axis passing through a tangential point in the plane of ring is:

(1) $\frac{5MR^2}{2}$

(2) $\frac{3MR^2}{2}$

(3) $\frac{4MR^2}{3}$

(4) $\frac{2MR^2}{3}$

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9. Find the eccentricity of the ellipse in which the length of the minor axis is equal to one fourth of the distance between foci.

(1) $\frac{4}{\sqrt{17}}$

(2) $\frac{2}{\sqrt{17}}$

(3) $\frac{7}{\sqrt{17}}$

(4) $\frac{8}{\sqrt{17}}$

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10. If $\theta \in \left[-\frac{7\pi}{6}, \frac{4\pi}{3}\right]$, then the number of solutions of the equation

$$\sqrt{3}\csc^2\theta - 2(\sqrt{3}-1)\csc\theta - 4 = 0$$

is:

(1) 1

(2) 2

(3) 3

(4) 4

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11. If

$$\lim_{x\to 0} \frac{\cos(2x) + a\cos(4x) - b}{x^4}$$

is finite, then $a + b =$.

(1) 0

(2) 1

(3) 2

(4) 3

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12. Statement-I: Melting point of neopentane is greater than that of n-pentane.

Statement-II: Neopentane gives only one mono-substituted product.

(1) Both S-I and S-II are correct

(2) Both S-I and S-II are incorrect

(3) S-I is incorrect but S-II is correct

(4) S-I is correct but S-II is incorrect

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13. A particle moves on a circular path of radius 1 m. Find its displacement when it moves from $A \to B \to A$**. Also, its distance are it moves from** $A \to B \to A$**.**

(1) Distance = 2 m, Displacement = 4π m

(2) Distance = 2 m, Displacement = 5π m

(3) Distance = 4π m, Displacement = 2 m

(4) Distance = 2 m, Displacement = 2 m

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14. If

$$\frac{dy}{dx} + 2y\sec^2 x = 2\sec^2 x + 3\tan x \cdot \sec^2 x$$

and $f(0) = \frac{5}{4}$**, then the value of**

$$12\left(y\left(\frac{\pi}{4}\right) - \frac{1}{e^2}\right)$$

equals to:

(1) 1

(2) 2

(3) 3

(4) 4

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15. The domain of the function

$$f(x) = \frac{1}{\sqrt{10 + 3x - x^2}} + \frac{1}{\sqrt{x + |x|}}$$

is (a, b)**. Then** $(1 + a^2) + b^2$ **is:**

(1) 26

(2) 30

(3) 25

(4) 29

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16. Two water drops each of radius r **coalesce to form a bigger drop. If** T **is the surface tension, the surface energy released in this process is:**

(1) $4\pi r^2 T$

(2) $8\pi r^2 T$

(3) $12\pi r^2 T$

(4) $6\pi r^2 T$
